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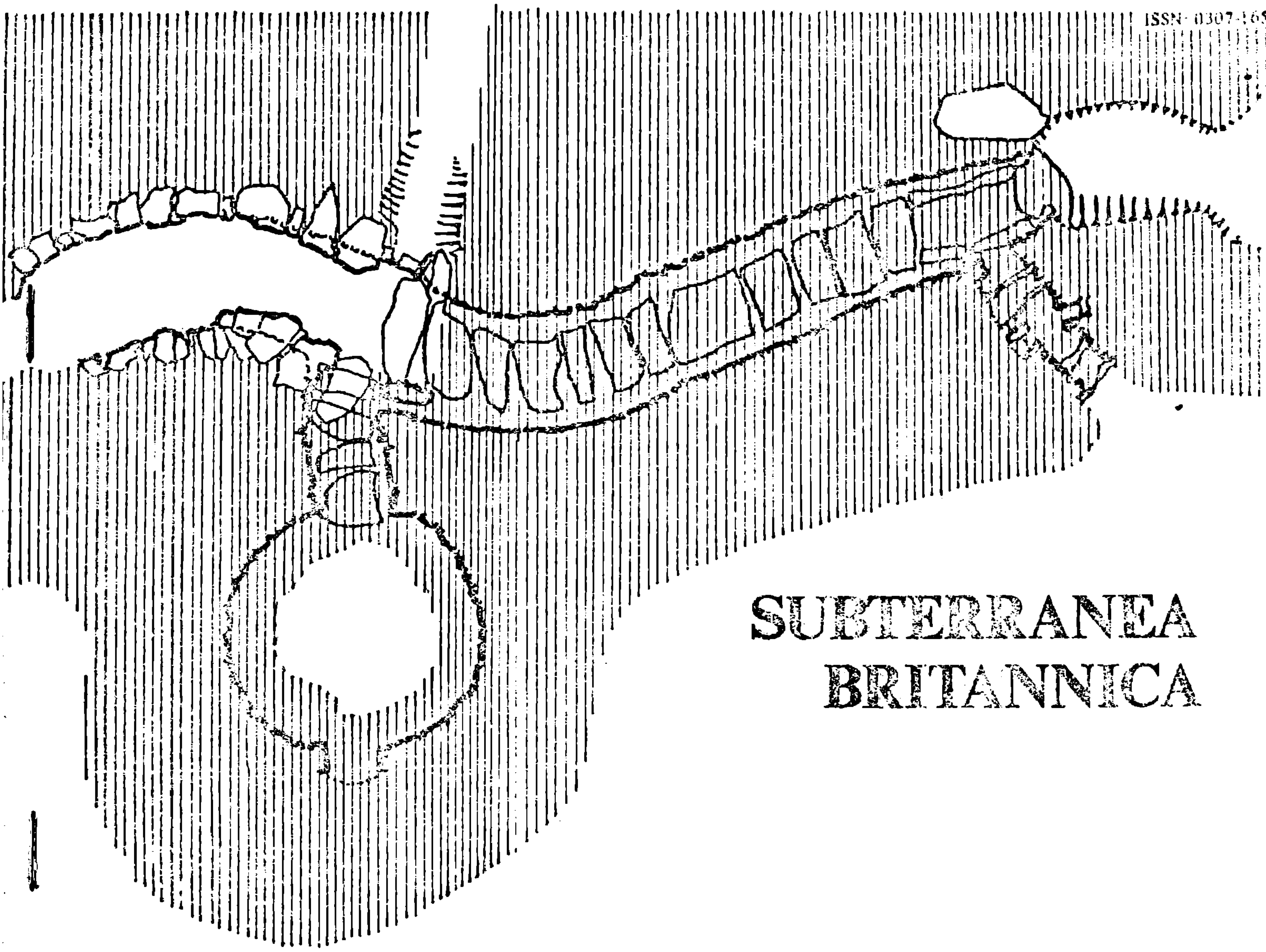

SUBTERRANEA BRITANNICA

Bulletin No. 6

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THE BULLETIN OF SUBTERRANEA BRITANNICA - NO. 6 AUGUST, 1977

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Subterranea Britannica is in association with Société Française D'Étude des Souterrains of France, and Arbeitskreis für Erdstallforschung of Germany.

EDITORIAL

It is with great pleasure that we are able to announce that a National Federation of Societies interested in man-made and used underground structures was officially constituted at Nottingham on Saturday, 19th March. It is to be named SUBTERRANEA BRITANNICA and is to bring together those who are interested among the Archaeological, Geological, Mining and Historical fraternities in this country and on the Continent in order that there can be an exchange of ideas on methodology, especially the surveying and cataloguing of results.

The older Society of this same name, we suggest should become the Cambridgeshire and Hertfordshire branch of the Federation and proposals will be made to this effect at the next Annual General Meeting.

The elected officers are: Chairman - Mrs. S. P. Beamon (Herts. and Cambs.), Vice Chairman - Mr. K. Barnes(Nottingham), Secretary - Mr. P. Sowan (Surrey), Treasurer - Miss E. Clark (Herts and Cambs.)

The newly formed Federation are to organise, and to be hosts for, the three day International Symposium for the Société Française D'Étude des Souterrains. The provisional programme will be found on the back page.

JOHN ALEXANDER

SUMMARY OF THE WINTER DAY CONFERENCE

On January 15th 1977 at Lucy Cavendish College, Cambridge, members heard some excellent advice from Mr. Frank Morgan on Safety Underground. This was followed by a most informative talk on Underground Surveying by Mr. Sheldon, of the Nottingham Historical Arts Society explaining the advantage of using the Miner's Dial - Theodolite, or if not available using the triangulation method.

After lunch Mrs. Blatchford reported on the October Conference to discuss Federation and told the meeting that a Steering Committee had been set up. In view of this, Mrs. Beamon asked members attending the meeting if they felt our Society should now be more local and perhaps become the Herts/Cambs Branch of the Federation. There seemed to be general enthusiasm for this change.

Mrs. Beamon reported that Britain would be the host nation in July 1978 to the International Conference. Discussion ensued on arrangements for this conference.

Mr. Tony Kemp then gave an interesting talk on Underground Fortification, illustrated by slides. He said there were hundreds of miles of military tunnels and much more project work was needed.

The afternoon ended with brief contributions from members. Mr. Nigel Pennick showed slides of a Medieval Cellar in Lowestoft and asked the meeting for help in dating the cellar. Mr. L. Hillman of London Subterranean Society gave a short talk on Vaults in Redundant Graveyards, in particular in the Highgate Cemetery, and was also interested in the Crystal Palace underground railway tunnel.

ELAINE BLATCHFORD.

A PRELIMINARY ACCOUNT OF THE LIME HOUSES OF THE BUXTON AREA - PART I

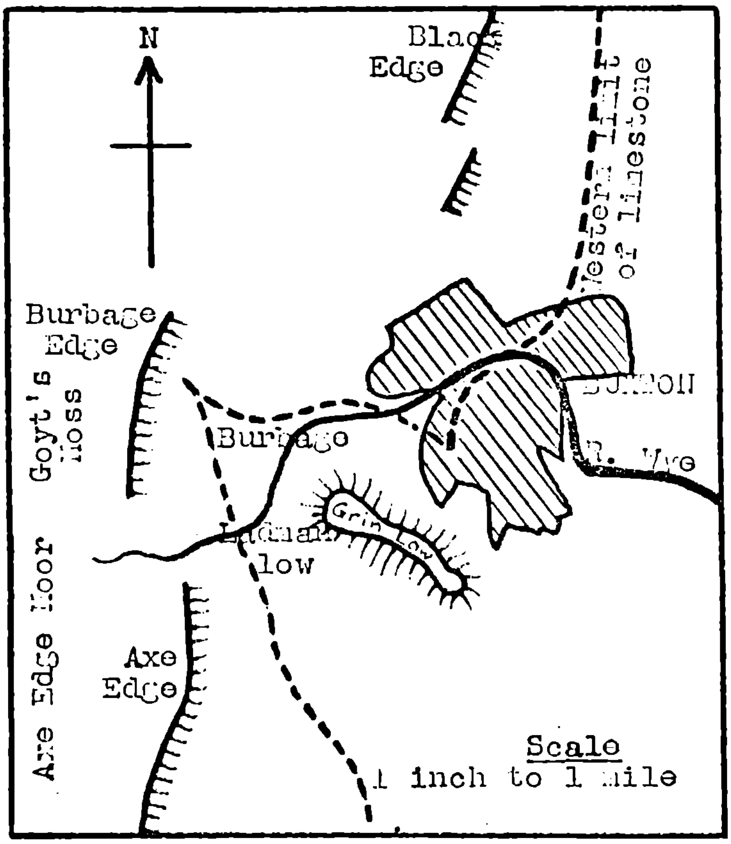
I call this account 'preliminary' because it does not purport to be exhaustive, showing simply, on the basis of the most readily available evidence, that there exist relics and some records and contemporary accounts of a form of subsurface dwelling which appears, by its nature, to fall within the main field of interest of this Society. What I hope to demonstrate is that the opportunity exists for someone who is in a position to spend some considerable time in or near Buxton, Derbyshire, to produce a substantial report, based probably on a thorough investigation of the documentary sources and, perhaps, on the results of a programme of excavation, which should greatly increase our knowledge of this type of dwelling.

The present account falls naturally into three main sections, which deal successively with the background of the phenomenon, contemporary descriptions and the material remains of such dwellings which may be seen today. The first two will be treated in this part of the account; the third section will be published later.

The Background

The former spa town of Buxton, the largest centre of population in the region known as the Peak District, in northern Derbyshire, stands at about 1000 feet (350 m.) above sea level, astride the faulted junction between the mountain limestone (Upper Avonian or Visean succession of the Lower Carboniferous system) and the shales and sandstones of the Millstone Grit series of the Upper Carboniferous. Perhaps I may be permitted to digress here to mention the fact that the Peak District reaches only a little over 2000 feet (700 m.) above sea level and contains no mountain peaks to account for its name, which is believed to be Celtic in origin, perhaps a corruption of a tribal name of the period before the Roman occupation. But now back to our rocks. Although the Millstone Grits lie below the true Coal Measures in the geological succession, thin beds of coal are found in them at various horizons and have been worked in the past on a small scale in various parts of the southern Pennines. Two miles west of Buxton, under Burbage Edge, and a little further south, on Axe Edge, such coal seams were worked, initially by opencast or adit mining, apparently at least as long ago as the early 17th century, and at a later date shafts were sunk on Goyt's Moss and Axe Edge Moor to reach parts of the same seams which were not readily accessible from the outcrop.

Long before the rapid increase in the rate of exploitation occasioned by the Industrial Revolution, the close proximity of coal and limestone led to the establishment of lime-burning activity in the Burbage and Ladmanlow area, presumably to satisfy local needs for quick and slaked lime for mortar, plaster and limewash used in the building industry. As demand grew during the 18th century, this activity extended eastwards along both the northern and southern slopes of Grin Low, a limestone ridge which reaches a height of 1400 feet (472 m. approx.), hemming Buxton in on the south west. Apparently it was more economical to carry the coal to the limestone than vice-versa. There is no trace of lime-burning in the vicinity of the coal-mine shafts to the west. The lime-burning process as then practised produced large quantities of ash, shale and rock waste, and though now overgrown with vegetation, these waste heaps are still recongnisable in the Burbage and Ladmanlow area and on the slopes of Grin Low. Now because of small quantities of quicklime which this waste contained originally, slaking and carbonization occurred fairly rapidly under the influence of percolating rainwater (Buxton enjoys an annual average rainfall of 48 inches (1.219 m. approx.)) so that these accumulations became consolidated quite soon, though never reaching a really rock-hard condition mainly because of the earth and other fine impurities which they contained. The 18th century lime workers were poorly paid and the custom arose of excavating a room or a series of rooms in such waste heaps to live in, thereby saving the rental of a properly built cottage in Buxton or nearby villages.



Sketch map of the Buxton Area

Contemporary Descriptions

The earliest mention I have found of these dwellings is that of Faugas de Saint-Fond, a French geologist who visited the quarries and lime workings at Buxton in 1784. Translated into English, his account[1] runs as follows:

> "I looked in vain for the habitations of so many labourers and their numerous families without being able to see so much as one cottage when I at length discerned that the whole tribe, like so many moles, had formed their residences underground. This comparison is strictly

> just; not one individual of them lodged in a house or even in the hollow of a rock . . . I felt much pleasure in visiting the residence of these troglodytes. Their occupation is certainly not attended with much profit as they are unable to procure the smallest conveniences, and though in the midst of stones and lime, have hitherto been too poor to erect walls".

Pilkington, in his book A View of the Present State of Derbyshire, four years later, refers to "ten... dwellings formed in the small hillocks which have been raised by the refuse of the lime kilns near Pole's Hole". +

Jewitt, in 1813, wrote:

> "One pecularity of feature in the landscape about Buxton, though far from picturesque, ought not to be passed over in silence, and this is those habitations known by the name of lime-houses with which the sides of the hills contiguous to the lime kilns are almost universally covered. We have frequently read of savages converting natural caverns into dwellings but that men in a civilised state should choose to scoop themselves burrows underground like moles and foxes, than to erect comfortable houses where materials are more than plentiful seems a paradox not easily solvable. Wretched and disgusting are these caves in the extreme and but for having their entrances closed by a door might be more easily taken for the dens of wolves or bears than abodes of humanised beings.
>
> Yet these hovels, wretched as they are, have different pretensions to convenience and even beauty. That of which the annexed sketch is given may convey an idea of one of the most cleanly and comfortable among them; it is situated on the right-hand side of the Leek road near the foot of Axe Edge".

Another account is to be found in Part I of the book by E. Rhodes, Peak Scenery, or Excursions in Derbyshire, published in 1818. To quote from pages 17 and 18:

> **"From Fairfield the lime hills around Buxton have a curious and delusive effect; they appear like an assemblage of tents, placed on a steep acclivity, in regular stages one above another, and they strangely disfigure the scene: as a feature in landscape, they are very unpleasant, yet they are not the least extraordinary places in the vicinity of Buxton. Many of them have been excavated, and they now form the habitations of human beings. Some of them are divided into several apartments, and one aperture serves to carry off the**

+ **(Poole's Cavern, a show cave at the foot of the northern slopes of Grin Low, now owned by the Buxton Civic Association and open to the public)** smoke from the whole. The roofs of these humble dwellings are partially covered with turf and heath, and not unfrequently a cow or an ass takes a station near the chimney, on the top of the hut, amongst tufts of fern and foxglove; which together produce a very singular and sometimes a pleasing effect. One conical hill, which I observed, contains within it five or six different habitations, and to the whole there appears but one or two chimneys: by what contrivance these are made to answer the common purposes of so many families, I have not been informed. When Faugas Saint Fond visited Buxton, he was astonished to see human beings entering into and emerging from these excavations in the earth, like rabbits in a warren. Strangers beholding these places, would never imagine them the residence of creatures like themselves. When I first saw them I knew not to what uses they were applied, for I did not then recognize them as objects I had previously met with in description, and none of their inmates appeared at the threshold to mark them out as dwellings. On a second look they had issued from their hovels as if by general agreement, and I found the whole hill was peopled --- not like the heathy glen in Scott's Lady of the Lake, with armed men at the signal of Roderic Dhu --- but with boys and girls, and men and women, who having gazed for a moment upon us, suddenly disappeared, leaving us to reflect at leisure on the unusual sight."

FRANK MORGAN (to be continued)

SPRING VISIT TO CHISLEHURST CAVES AND GREENWICH PARK

14th May saw members of Subterranea Britannica visiting Chislehurst Caves and Greenwich Park. Sunny, if cool, weather added to the enjoyment of a guided tour of the Caves which are a mesh of tunnels cut into chalk. Fact and fiction intermingled as we heard of the caves being used as air-raid shelters during the 1939-45 war and of the slaying of beautiful maidens by Druids in earlier times. Evidence of construction and use made of the caves is absent, except for numbers on the walls, grim reminders of people having space allocated to them for spending the night during the war.

Mr. Julian Watson very kindly took us to see the Conduit Heads in Greenwich Park. He had previously talked to the Society about the park's underground conduit system where, since the 13th century, spring water is no longer needed for local uses, the conduits still serve as land drains. (See Bulletin No. 4)

Walking from one Conduit Head to another, within view of the Royal Observatory and a Royal Palace turned into a Royal Hospital for Seamen, one had a pleasurable feeling of history, not least when looking at the older houses bordering the Park, in one of which a cistern was placed. From this cistern, water once flowed for the royal use in the Tudor Palace.

ELEANOR CLARK.

THE ROMAN SEWER IN CHURCH STREET, YORK

The Sewer was uncovered during redevelopment of a site on the corner of Church Street and Swinegate in 1972. A large stone block was struck which was found to be one of the millstone grit roofing slabs of a Roman sewer. Excavation by the York Archaeological Trust was allowed to proceed alongside the work of foundation laying already begun, in December 1972 and January 1973.

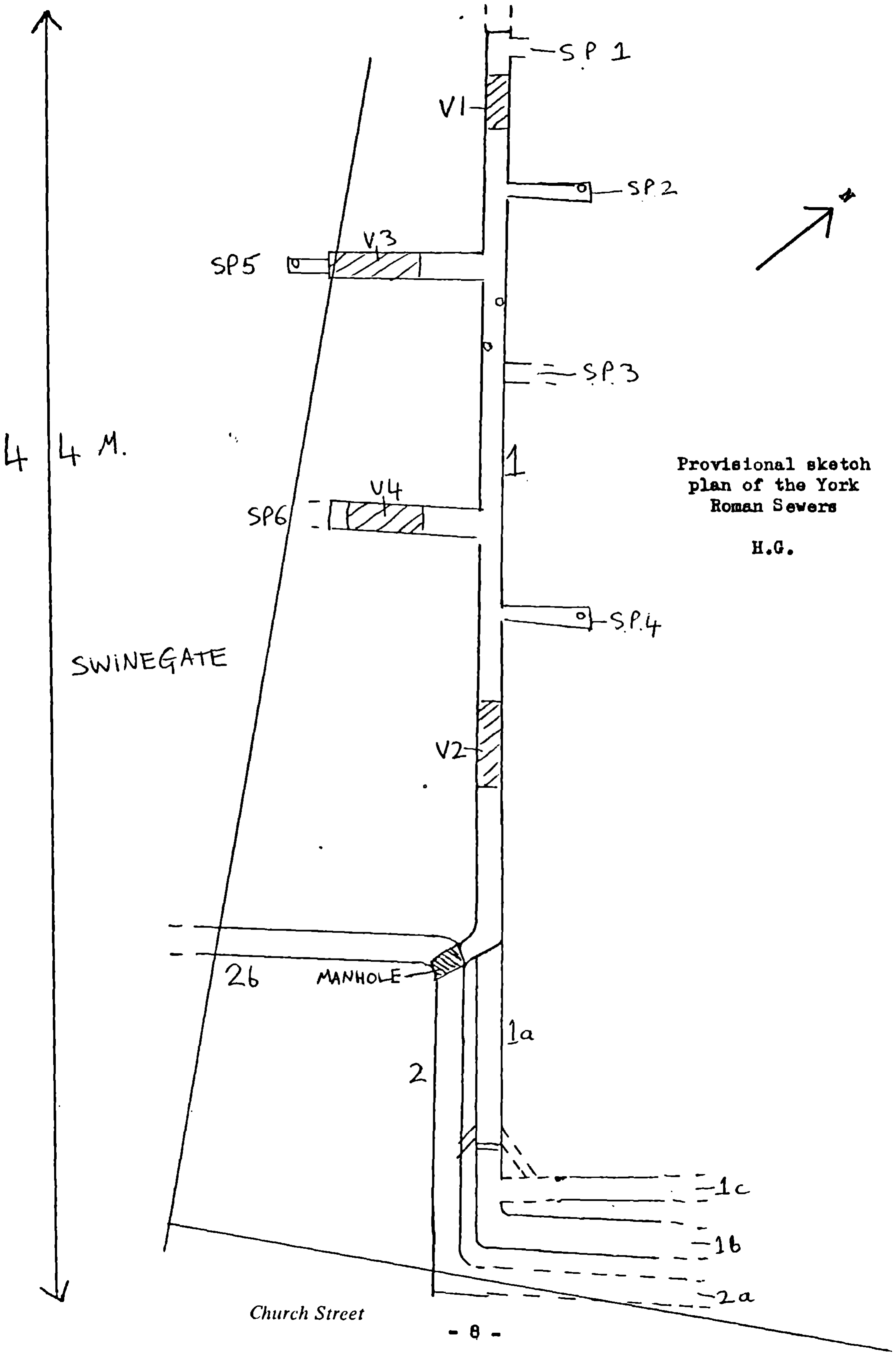
The site is very close to the postulated line of the intervallum road of the military fortress, and the sewer may eventually have run along one side of this road, and out through one of the main gates. A system of drains and sewers was common in military contexts, whereas in British towns few but the coloniae have this arrangement.

The passages excavated run some 44 metres north-west to south-east, parallel to the Via Principalis but not parallel to the medieval street plan which is at a slight angle to the Roman. A system of three alignments turns at right angles to the main ones, north-easterly to run under Church Street for a distance. A further passage runs south-westerly out under Swinegate. It is beneath part of Church Street that the intervallum road is believed to have run.

The water supply that fed this sewer and indeed the whole fortress, though not necessarily the colonia, may have come from as far as the Wolds, 15 miles away. This would need to be a plentiful supply, and be at an altitude sufficient to allow gravity flow along aqueducts and pipelines. No evidence of any kind has been found to suggest a source of this kind outside the fortress, nor yet of any pump or waterwheel to raise water from the nearby Ouse.

Dimensions of the passages vary from 80 cms. to 120 cms. (four courses of millstone grit blocks) in height, and from 65 cms. to 110 cms. in width. They are constructed either of large blocks of millstone grit, or of small limestone ashlars, possibly indicating two separate stages of building. The roofing is for the most part of huge millstone grit slabs, with vaults some of which are known to pass under the lines of Roman walls, so presumably were designed to take the extra weight. In the side passages these are of tile but their arcs are too shallow to have provided much support. In alignment 1, the two vaults are of stone. Nowhere are they particularly well bonded with the walls. In the side passages the vaults sit on courses of limestone ashlars similar to those of which alignments 2, 2a and 2b are built, and are possibly later insertions into an original structure. Some of the roofing slabs may have been lifted and reset, using irregular stones or small limestone ashlars to make them sit firmly, or this may have been part of the original construction to bring the heights of the walls to a level. The flooring throughout the channels is of slabs of Jurassic sandstone, set closely together with mortar. At the junction of alignments 2 and 2b there is a Roman manhole. This is roughly rectangular and of tile, seven courses one side and four the other, set in thick mortar and corbelled. The access point above was closed with a Jurassic limestone slab like those of the floor. The tooling on the millstone grit blocks is diagonal and apart from a few exceptions, seems to have been worked elsewhere, and not in situ.

The regularity of the arrangement of the side passages could suggest that the two stone vaults and the side passages were original parts of the same layout in spite of later modifications. If we assume that the construction material of the original was millstone grit blocks and that the limestone ashlars represent later additions and repairs, three phases are discernable, focussed especially in alignments 1a and 2. Firstly the block construction, that is



Provisional sketch plan of the York Roman Sewers

H.G.

alignments 1, 1a, 1b and 1c; secondly a repair at the junction of 1a and 1b: thirdly the insertion of the barrier to divert the flow into alignment 2, possibly due to malfunction in 1a. At this stage the South-West face of 2 was replaced in small ashlars. The ashlars in 2b are of a similar size, and were presumably contemporary. The manhole may also belong to this stage. The abandonment of 1a is dateable by the pottery it contains to the late 2nd or early 3rd century A.D.

In the blocked-off alignment 1a were found slots in the walls, and a hole in the roofing slabs, of a size suitable for a sluice gate, though no traces of this were found, and deposits indicate that it was absent during the final phases of use. When present this would have diverted the flow through two small bypass channels into 1c and 2. The slots could have carried a solid gate or a grille. The function of a gate would be to keep clear of silt the corner of 1a with 1b, and to prevent the backflow of sewage during flooding, whereas a grille would be useful for security against intruders attempting to gain access to the buildings within the fortress, whilst not hindering the outward flow.

What kind of buildings did this sewer serve ? The deposits still remaining provide some clues, but only to the final stages of use, as it was presumably regularly cleaned out when it was in full use. These deposits indicate the presence of some foul, but mainly clear, water. In side passage 5, remains of sewage flies may imply that in its later use, it served as a latrine. The kinds of fauna that would indicate open air and street drains feeding the sewer are almost completely absent. In fact, both the organic remains, and the artefacts recovered in the excavation - gold jewellery, shale bracelets, pins, gaming counters and bath flasks - suggest very strongly that the sewer served a bath house. Some of the articles indicate the presence of women inside the fortress. This may have been a successor to the legionary bath house which lies under St. Sampson's Square, and which can be seen in the 'Roman Bath' public house. It is possible however, that the sewer was not originally designed to carry the volume of water that would be released during the cleaning of a public bath, as its dimensions are relatively modest.

Other contents of the passages - building rubble and animal bones - may be the result of dumping after the sewer went out of use, and they give no real indication of the functions of the buildings above.

Although the date of the construction of the sewer is impossible to fix, due to the necessary regular clearing to allow it to function, some hint of the final disuse is available through the pottery evidence. The passages were not used in the post-Roman period, and alignment 1a fell out of use at the end of the second century. Pottery of the fourth century was found in alignments 1 and 2 though not of the end of that century. Vessels could be almost completely reconstructed from sherds recovered in excavation which suggests dumping in the passages after they went out of use. Thus a lot of the pottery could be regarded as residual. Nevertheless, it seems reasonable to put the final stage of use at some time between 350 and 400 A.D.

Although redevelopment on this site is now completed, access to the sewer is still possible. Parties are sometimes given conducted tours by staff of the York Archaeological Trust, 47 Aldwark, York, whose Director P.V. Addyman is thanked for permission to print this account.

HELEN GANDY

ICE HOUSES OF GREAT BRITAIN - PART II

This is the second in a series of articles designed to record British Ice Houses. Further accounts would be welcomed.

* * *

THE TOWNELEY HALL ICE HOUSE - TOWNELEY, LANCS.

History recounts that in 1200 A.D. Roger de Lacy granted lands at Tunleia to Geoffrey, son of the Dean of Whalley, on the occasion of his marriage. This permitted Geoffrey to build a hunting lodge and entitled him to a share of the pasture lands. It is believed that it is on these lands that Towneley Hall was originally built, for defence purposes, in the 14th century. Many building phases occurred and we have positive records of additions and alterations in the 15th, 18th and 19th centuries. Towneley Park was created in 1490 by Sir John Towneley during the Renaissance period when 'garden making' became a popular art. Both Hall and Park comprising over 200 acres of land remained in private ownership until the beginning of this century.

The main group of buildings is centrally situated in the parklands which slope gently, facing North-East, down towards the river Calder which has a wide flood plain.

The Ice House is located approximately 200 m. from the Hall to the North, and is a considerable distance from the river. It is dug out of the natural sloping ground with an artificial mound of earth over the upper part of the structure. The North-East facing entrance is on the lower slope and access to the main chamber is gained by passing through three doors enclosing two small chambers which act as air locks (5 m. long overall). The main chamber is cylindrical with a domed roof and tapering slightly to a circular floor at the base. Its dimensions are 5 - 6 m. high, and 4.2 m. diameter at mid-height. Centrally featured at the top of the dome is a grid enclosed in a circular stone collar, and it is believed that the lid was a tightly fitting circular slab. In the floor is a drain covered by a grid incorporating an air trap to permit water from the melted ice to flow down the slope, and at the same time, preventing air from entering the chamber.

Hand made bricks were used for the construction of the main chamber, and passage and walls were rendered with a lime mixture to ensure dryness of the interior. None of the original doors remain, but otherwise the ice house is in an excellent state of preservation, and the Department of the Environment have declared it a 'listed building'. During September (1976) this year the Ice House was opened up, and plans are going ahead to build a guard rail at the entrance to the main chamber, and fit new doors in the passageway. Once this work is completed, the Ice House will be opened to the public. It is a commendable fact that with the interest and help of the Towneley Hall Society, the Burnley Corporation and the Department of the Environment, an Ice House has been preserved for present and future generations to see.

Because of the many phases of building at Towneley, it will be necessary to make further investigations before a reliable estimate of its date can be suggested. However, taking into consideration its size, shape location and materials used, it cannot be dated earlier than the 18th century.

THE READ HALL ICE HOUSE, READ, LANCS.

Read Hall is centrally situated in the grounds of Read Park on a South facing slope which runs down into the Calder valley.

The Ice House stands about 75 - 100 m. from the Hall, and is dug out of the sloping ground with a mound of earth built over it. The entrance to the main chamber is on the upper slope facing North although the door no longer exists, and it seems unlikely that there was ever a passageway or entrance chambers for this ice house. It is cylindrical (5 m. high and 3 - 4 m. diameter) with a domed roof, and the walls taper slightly down to the circular floor. Centrally placed in the dome is possibly a tiny square ventilation hole (30 cm.), and the whole structure is brick built possibly having had a wooden door. A date of early 19th century has been suggested, but there is insufficient evidence to place much reliance on this.

It is interesting to note that only one of the three Ice Houses discussed (Towneley Hall) is in public ownership, and it is the only one of the three which is a 'listed building' by the Department of the Environment. There is a problem if the Ice House is not dated, or if the date is later than 1814, but once a precedent is set with the earlier buildings it seems logical that the others should come within the same category and be listed.

The Ice Houses discussed in this paper (see also Bulletin 5) are just three of those which I have investigated over the past two years. In order than an overall analysis and assessment may be made, it is necessary to carry out and record the investigations systematically throughout the country. Proposals for doing this are at the moment under discussion. In considering these proposals, particular attention should be given to the following :- geographical location, environment, constructing materials, function, history and chronology, excavation, conservation and climate.

With regard to climate, since about 800 A.D. in Western Europe, fairly accurate records are available for changes in climatic conditions over periods of time. These show a high correlation with recent results obtained by oxygen isotope methods used for measuring temperatures. (Personal communication from Prof. H. H. Lamb). From the middle of the 15th century, there was a cold period with a warm phase about 1500 A.D., and then another colder period coming in about 1550 A.D., becoming even colder until about 1700 - 1730 A.D., when temperatures started to rise again. This cold period is often referred to as the 'Little Ice Age', and evidence suggests that in some places, they 'enjoyed' very cold winters and warm summers during this phase. There is no doubt that this particular aspect should be taken into consideration in relation to any discussion about Ice Houses especially if we make comparisons with our present day climate. It may be feasible to test the hypothesis that a warm period in the late 18th century was an environmental stress which precipitated the technological advances made in the advent and progress of refrigeration techniques from 1820 onwards.

EILEEN ALDWORTH

REPORT OF THE SYMPOSIUM, ORGANISED BY THE WILLIAM PENGELLY CAVE STUDIES TRUST LTD. AND THE CHELSEA SPELEOLOGICAL SOCIETY, ON SOUTH EAST ENGLAND, AND HELD AT THE GEOLOGICAL SCIENCE INSTITUTE, LONDON 30TH - 31ST OCTOBER, 1976.

Dr. George Black opened the meeting and chaired the morning session.

Harry Pearman (Chelsea Spel. Soc./Pengelly Trust) began his lecture on Underground Exploration in South East England by classifying the human origin of cavities, giving four main reasons for them, in the following manner:

1. Extraction: whereby the hole is a by-product, an unwanted by-product, and in a sense, a pollution. Examples: mining for chalk, sand, gypsum, coal, iron, flint, and in the construction of wells, water.

2. Storage: the converse of extraction as the material removed is unwanted and superfluous. Examples: cellars, underground reservoirs, ice houses, sepulchral structures, ossuaries, catacombs, crypts, vaults and cesspits.

   Military: storage of arms, air-raid shelters.

   Dwellings: of which there is a scarcity, and rock shelters.

3. Conduction: of people and goods. Examples: secret passages, sallyports, vehicle and railway tunnels, canal tunnels, Channel tunnels.

   Sub-surface: services. Examples: gas, water, cables, electricity.

4. Amusement: digging for fun. Examples: follies, grottoes, landscaping.

All the above are primary uses, and each example was illustrated with a slide of a relevant site.

Secondary uses were noted, for example, a cellar being converted to a wine store or a rifle range, and a chalk mine to an air-raid shelter. The geology of South East England is varied, and a lot of the available rock is easy to cut.

Paul Sowan (Croydon Nat. History and Scientific Soc.) followed by discussing Upper Greensand 'hearth-stone' extraction as an example of category 1, with its properties and uses from step whiteners in the past, to the present use as scouring powder. It is a refractory material, and suitable for lining kilns.

Rod LeGear (Cantium Cave and Mine Research Group) spoke on Deneholes, and the lack of publication on these structures, but that they had been for the extraction of chalk for marling, and were not burial chambers. These were classified in two ways. The early ones were called Deneholes, and in some cases were associated with Medieval boundaries, and were usually carefully dug. Structures of the 17th and 18th centuries are known as Chalk Wells, which were roughly cut and are the more dangerous from the point of view of examination and surveying.

Symposium on South East England (Cont'd)

After lunch, John Essex chaired the afternoon session.

Dr. G. de G. Sieveking (Dept. of Romano-British Antiquities, British Museum), described flint mining by Prehistoric man at Grimes Graves, and how the 'floorstone' (the best flint) was prized out by antler pick, first by making holes with the point of the pick to break the tension, therefore enabling the flint blocks to be removed.

Sylvia P. Beamon (Subterranea Britannica) gave a short resumé of the October meeting forming the Federation, and continued with a lecture on the Royston Cave, a bell-shaped structure situated under the crossroads at Royston, which is engraved with religious figures together with other symbols and signs dated to the Medieval period. The three previous theories were put forward and her own hypothesis that the upper storey had been used for storage, and the area below as a chapel by the Knights Templar, who were known from records to have had a market stall in the town for over 50 years in the vicinity of the Cave. There are also similarities to some of the symbols seen at the Chateaux de Chinon in the Tour du Coudray (Indre et Loire), which are also attributed to the Templars.

Tony Kemp (Kent Defence Research Group) explained the manner of fortifications from the Medieval period onwards, which is the art of creating an obstacle between you and the enemy, or adding to a natural one. He also described how the enemy could counter-attack by mining into the defences, in some cases by revetting the sides of a tunnel horizontally, and how they overcame the problem of ventilation by sinking auxiliary shafts. They then lit a fire at the bottom, placing a windsail on the top, and by this means drew air down into the gallery.

This Symposium was well organised, extremely varied and interesting and we look forward with pleasure to their future ventures.

SYLVIA P. BEAMON.

BRIEF NOTE

Last year my husband and I were on holiday in the Dordogne district of France. One of the towns we visited was Brantome; it has an ancient Abbey by the river with caves beneath. More buildings have been built in man-made caves in the hillside beside the river; even the town's fish farm and many cars are kept in such places.

One morning we found there was a fire in one of the cave-garages. Acrid smoke was billowing out, and when firemen eventually managed to drag the car out its colour had changed from its former orange to a dull khaki ! A hazard of modern troglodyte life.

CYNTHIA LAWSON.

LETTER

FOGOU - FOGARA

We have received a letter from Dr. W. A. Macfadyen wo has raised an interesting question. He wonders whether infiltration tunnels for water supply, mostly ancient, named kahrez in Iraq and qanat in Persia but which he thought in Israel, Syria and in the Arabic speaking lands to the West, namely Tunisia, Algeria and Morocco, were called fogara have any connections with the Cornish fogous, perhaps through a Celtic word.

Frank Morgan offers the following comment:

In R. M. Nance's Cornish-English Dictionary (1955), the forms fogo and fougo (though not fogou) are recorded with the senses, cave and underground chamber, and one is further referred to the forms fūg - "a small cavity in rock" (I believe this is also met in mining terminology in the form vug, meaning a geode) and both gogo and ogo, meaning cave.

Cornish is a language in which initial consonants may mutate in a way similar to that found in Welsh (where, for instance, mawr - great - in some contexts becomes fawr). Taking this fact into account, the relationship between the word fogou and the Welsh word for cave - ogof - becomes apparent and, rather more distantly, the Irish Gaelic uaimh (pronounced oo-av) and the Scottish Gaelic uamh. The Irish, in fact, use the term uaimh thalún (ground cave) to refer to a souterrain or 'fogou'.

We see, then, that in three Celtic languages, territorially in close proximity, congnate words for cave or souterrain may be as diversely spelt as fogo, ogof and uaimh, so the probability is very low that a word with the same sense should have had a form beginning 'fog-' in the Middle East. One Celtic language, Galatian, did in fact exist, though we know very little of its vocabulary. The Galatians to whom St. Paul wrote (in Greek probably) were a group of Celtic invaders who settled in Asia Minor in about 250 B.C. Their language remained in use in that area into the 6th century A.D. and words from it could, therefore, just conceivably have been incorporated in Syrian Arabic.

However, in this particular case we have no evidence of a connection. The Arabic word cited, fogara, seems to be based on a thoroughly Semitic root which gives also the Arabic nouns fūgar, the mouth, and fūha, a hole, abyss or chasm, and the verb faqr, to pierce or bore. If, in fact, Syrian Arabic had borrowed the word fogara from a foreign language as the name of a particular type of structure of far from universal occurrence, we should not expect to find words in Arabic which are closely related to it in etymology, yet describe common phenomena.

Unless more compelling evidence turns up we may only conclude (however regretfully) that it is only by pure coincidence that fogou and fogara share the same first syllable.

It may be mentioned in passing that the Italian word fogna (pronounced fon-ya), a sewer, appears to be derived indirectly from the late Latin verb fundiare, meaning to excavate. The 'g' is not part of the root but has intruded in response to changes in pronunciation and Italian spelling conventions. I can trace no etymological connection with either the Cornish or the Arabic word.

NOTICE

We draw your attention to the following Symposium being organised by the William Pengelly Cave Studies Trust Ltd. and the Nature Conservancy Council. The theme of the Symposium is CAVING AND THE COMMUNITY and will be the development of a dialogue between cave users and planners. The speakers will include Ben Lyon, Dave Allsop, Dr. G. Jefferson and the Planning Officer from Somerset County Council.

The Symposium is to be held on SATURDAY, NOVEMBER 19TH 1977 at the Institue of Geological Sciences, Exhibition Road, London S.W.7. Further information is available from Dr. G. P. Black, 107 Andover Road, Newbury, Berks. Please enclose a stamped addressed envelope for a full programme and acknowledgement if booking a seat for numbers are limited to 200.

LITERATURE RECEIVED

Guide Book - The Shell Temple of Margate, known as The Grotto. (undated) 10 p.

BRIDGEWATER, Howard - The Grotto, (4th Edition) Printed by North Foreland Press Ltd. Broadstairs. (undated) 72 p.

SHAW, Conan and Nellie - The Shell Temple of Margate - An Archaic Masterpiece Cooper The Printer Ltd., Margate, 1954. 26 p.

SOWAN, Paul W. - Article Firestone and Hearthstone Mines in the Upper Greensand of East Surrey. Reprinted from the Proceedings of the Geologists' Association, Vol. 86, Part 4, 1975, pages 571-591.

SOWAN, Paul W. - Article Stone Mining in East Surrey, Surrey History Vol. I No. 3, pp. 83 - 94, Surrey Local History Council, 1975.

SOWAN, Paul W. The Firestone and Hearthstone Mines at Godstone, General Excursion Notes, No. 15. Published by Croydon Natural History and Scientific Society Ltd., Croydon, April 1976. 20 p.

HUTTON, Walter E. - Article A Walk into the Past, Goathland News. Issue No. 8. February, 1975. pp. 3 - 6. (This article refers to mining. whinstone at Goathland.) Published by J. H. & E. Goldsbrough, "Water Ark Lodge", and F. & C. Nuttall, "Heatherstone", Goathland.

Current Titles in Speleology Number Eight, 1975 International. A Manol Publication. Publisher, Tony Oldham, Lower Dan Barch Wolfscastle, Dyfed. February, 1976. p. 165. (This publication is most useful for it lists relevant items from periodicals under inter and non regional topics.)

Current Titles in Speleology Number Nine, The Literature of 1976 A Manol Publication. Publisher, Anne Oldham, Rhychydwr, Crymych, Dyfed, SA 41 3RB. (moved from previous address). February, 1977. 202 p.

The latter two publications cover literature from Africa, America, Asia, Australasia, Antartica and Europe.

SUBTERRANEA BRITANNICA

PROVISIONAL PROGRAMME FOR THE BRITISH FEDERATION SYMPOSIUM IN CONJUNCTION WITH THE SOCIÉTÉ FRANÇAISE D'ÉTUDE DES SOUTERRAINS

13TH - 16TH JULY, 1978

THURSDAY EVENING, 13th July. Assemble at Cambridge. Dinner at the Arundel House Hotel approximately 8 p.m. For early arrivals (and those who may like to) a tour of two or three Cambridge Colleges.

FRIDAY, 14th July

9 a.m. - 12.30 p.m.	Papers to be presented.
12.30 - 2 p.m.	Lunch
2 p.m. - 4 p.m.	S.F.E.S. AssembléeGénérale (Annual General Meeting) and continuation of Papers.
4 p.m.	Visit to Fowlmere passage, then on to Royston Cave - travel by coach.
8 p.m.	Dinner in one of the Cambridge Colleges.

SATURDAY, 15th July

9 a.m.	Leave for day trip to Nottingham to explore their numerous underground caves and passages including a new system recently found, and being opened for our benefit. Coach.
12.30 p.m. - 2 p.m.	Lunch can be obtained in the area.
5.30 p.m.	Return to Cambridge.
8 p.m.	Dinner at the Arundel House Hotel.

SUNDAY, 16th July

9 a.m.	Coach to Chatham Underground Fortress. Lunch in the vicinity. Return to London to transport terminii for final dispersal (return to Cambridge for those from the district.)

The suggested theme for the Symposium is: Man-made Underground Structures : their Industrial Exploitation.

It is requested that Papers should be limited to 20 minutes maximum and the number of relevant slides kept to a minimum. Notification of the title of the Paper to be presented together with a short summary for translation be forwarded if possible to the Organising Secretary, Sylvia P. Beamon by the 1st June.